

MICHIGAN DEPARTMENT OF NATURAL RESOURCES  
FISHERIES DIVISION

**STATUS OF THE FISHERIES  
IN MICHIGAN WATERS OF  
LAKE ERIE AND LAKE ST. CLAIR  
2003**



*Lake St. Clair muskie caught in an assessment trap net in 2003.*



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## Highlights for 2003

The purpose of this report is to provide an update on the status of the fisheries in the Great Lakes and connecting waters of southeast Michigan. Sources of information used in compiling this report include creel surveys, charter boat reports, an angler diary program, the Master Angler program, and commercial fishery records, as well as fisheries research studies. Some of the 2003 highlights described in detail include:

- Lake Erie yellow perch abundance has increased in recent years, whereas walleye abundance has declined. Walleye experienced very good reproduction in 1999, but very poor or below average reproduction in 1995, 1998, 2000, and 2002.
- Non-charter angler catch rates for Lake Erie walleye increased slightly in 2003, while yellow perch catch rates improved for a third straight year. Angler effort declined, but remained consistent with the levels observed since 1995.
- Creel surveys estimated a combined harvest of 222,000 walleye and 498,000 yellow perch from the Michigan waters of the Detroit River, Lake St. Clair, and St. Clair River. Over 186,000 legal-sized smallmouth bass were caught, but over 92% of those were released.
- Charter boat catch rates for Lake Erie walleye were about three times higher than those estimated for non-charter anglers, while yellow perch charter boat catch rates were slightly lower than those estimated for non-charter anglers.
- Entries in the Master Angler Program clearly show that Lake St. Clair is the premier Michigan water for trophy muskellunge and smallmouth bass.
- The trap net survey of Lake St. Clair in 2003 documented the growth of the strong 1998 smallmouth bass year class beyond the minimum size limit. Older, trophy-size smallmouth bass were also well represented in the trap net catch.
- Long-term walleye tagging studies on Lake Erie illustrate the important contribution of Lake Erie walleye to the Great Lakes sport fishery of Southeast Michigan, from Port Huron to Toledo.
- Tagging studies of lake sturgeon in the connecting waters since 1997 have demonstrated that lake sturgeon routinely move between Lake St. Clair and southern Lake Huron.

## Fishery Forecast for 2004

Annual variation in the reproductive success of walleye and yellow perch can result in substantial year to year changes in the abundance of these species. Harvestable-size yellow perch abundance will be about the same as last year in Lake Erie and Lake St. Clair, with strong contributions from the 2000, 1999, and 1998 year classes. Legal-sized walleye abundance will decline in 2004 due to extremely poor recruitment experienced by Lake Erie walleye in 2000 and 2002. Regulatory changes necessitated by the downward walleye population trend are discussed in the "Sport Fishing Regulations" section of this report. Muskie and bass numbers tend to remain more stable from year to year and both species should continue to provide excellent fishing opportunities in 2004, particularly in Lake St. Clair and the Detroit River. However, weather conditions can affect sport fishing success as much as fish abundance. Therefore it is difficult to predict fishing success. Water levels are forecasted to increase only slightly this year, thus shallow waters may restrict angler access to some fishing areas in the connecting waters.

## Sport Fishery Summary

An on-site creel survey conducted by the Michigan Department of Natural Resources (MDNR) produced a total harvest estimate of 416,331 fish (Table 1) for Michigan's 2003 Lake Erie sport fishery (non-charter). In combination, walleye and yellow perch accounted for 93% of the total harvest, illustrating the importance of both percids in the sport fishery. Estimated angler effort in 2003 declined, but remained consistent with levels observed since 1993 (Figure 1). Catch rates for both walleye and yellow perch improved slightly in 2003 (Figure 2). Trends in angler effort and catch rates for walleye and yellow perch since the mid-1980's suggest that the level of angler effort on Lake Erie is affected by many factors in addition to catch rates. Other factors, including weather, prey fish abundance, fishing success on other Great Lakes waters, and regional economic conditions have likely contributed to the comparatively low level of fishing effort since 1991.

Biological data were collected from walleye and yellow perch during the 2003 on-site creel survey. The 1999 year class (age 4) dominated the

walleye harvest, comprising 53% of the catch (Figure 3). Harvested age 2, 3, and 4 walleye averaged 366 mm (14.4 in.), 434 mm (17.1 in.), and 478 mm (18.8 in.) in total length. The overall average length of walleye harvested in the sport fishery in 2003 was 467 mm (18.3 in.).

Yellow perch harvest was dominated by age 4 fish (1999 year-class), which accounted for 32% of the total harvest (Figure 3). In combination, age 2 (24%) and age 5 (21%) contributed an additional 45% of the total harvest. Average lengths of harvested age 2, 3, and 4 yellow perch were 195 mm (7.7 in.), 211 mm (8.3 in.), and 225 mm (8.8 in.), respectively. The observed mean length at age for yellow perch taken in the Michigan sport fishery has gradually increased over the past 4 years to near the level of the mid-1990's (Figure 4). Improved size at age may reflect reduced exploitation and improved survival of the faster growing fish in each cohort. Alternatively, changes in the food web of the western basin could also be a factor.

In 2002, on-site creel surveys conducted by the Michigan Department of Natural Resources (MDNR) produced a total harvest estimate of 993,615 fish (Table 2) for Michigan's waters of the Detroit River, Lake St. Clair, and the St. Clair River. The primary species harvested in the Detroit River were white bass, walleye, and yellow perch. In Lake St. Clair, yellow perch, walleye and smallmouth bass were most abundant in the harvest. Walleye and yellow perch were the most common species harvested from the St. Clair River, where a few trout and salmon were also taken. Estimates of total catch (including harvest plus legal-size fish caught and released) were calculated for selected species and revealed some interesting patterns. Only about 7% of the legal size smallmouth bass caught were actually harvested from the connecting waters in 2002. Similarly, about 10% of the legal size muskies caught were harvested. Alternatively, for walleye, nearly 95% of all legal-sized fish were harvested.

Biological data were collected from harvested walleye and smallmouth bass during the 2002 Lake St. Clair on-site creel survey. The 1999 year class (age 3) dominated the walleye harvest, comprising 70% of the catch (Figure 5). The overall average length of walleye harvested in the Lake St. Clair sport fishery in 2002 was 452 mm (17.8 in.). For smallmouth bass, the 1998 year class (age 4) accounted for 50% of the harvest.

The overall average length of smallmouth bass harvested in the Lake St. Clair sport fishery in 2002 was 399 mm (15.7 in.).

A comparison of 2002 harvest rates for the major species sought in the Great Lakes waters of southeast Michigan indicates that perch fishing success was highest in Lake Erie and Lake St. Clair (Figure 6). Walleye fishing success was best in Lake Erie and the Detroit River. White bass fishing success was best in the Detroit River and Lake Erie.

Since 1989, Michigan charter boat operators have been required to report their charter fishing catch and effort to the MDNR. In 2003, Michigan charter boat anglers harvested 68,792 fish from Lake Erie (Table 3). Walleye (58%) and yellow perch (40%) were the major species harvested, accounting for 98% of the catch. Charter boat walleye catch rates were more than three times higher than those estimated for non-charter anglers in 2003, while the yellow perch charter catch rate was slightly lower than the rate for non-charter boat anglers.

On Lake St. Clair and the St. Clair River, charter boat anglers harvested 13,740 fish (Table 4). Yellow perch (51%), "other" species (39%), and walleye (10%) made up the bulk of the catch. The "other" species category is thought to consist mainly of smallmouth bass and muskellunge.

During the period since 1990, walleye catch rates have remained relatively high for Lake Erie charter boat anglers (Figure 7), but declined markedly after 1990 for Lake St. Clair charters (Figure 8). In 2003, the charter catch rate for Lake Erie walleye remained consistent with levels typical of the 1990's. Over the last 10 years, the walleye charter catch rate for Lake Erie has been about 4 times higher than the Lake St. Clair rate. This difference may be a reflection of much lower walleye densities in Lake St. Clair throughout this time period. The decline of the Thames River walleye population would likely be a contributing factor to lower walleye abundance in the lake since 1990.

Lake Erie charter boat harvest and catch rates for yellow perch decreased to the lowest level since 1996 (Figure 7). Much of this decline is attributed to very poor weather conditions in October, a month when the charter fishery focuses on yellow perch. Yellow perch catch rates for charter boats on Lake St. Clair have been more variable (Figure

8), but also declined dramatically in 2003. Poor fall weather is suspected to have been a factor in the Lake St. Clair decline too. The number of reported charter excursions on Lake Erie declined slightly in 2003, while Lake St. Clair excursions were the highest since 1992 (Figure 9).

Muskellunge catch rates derived from the Angler Diary Program on Lake St. Clair indicate that catch rates improved through the late 1980's and early 1990's and have remained fairly steady over the past 10 years (Figure 10). We believe the quality of the Lake St. Clair muskellunge fishery is also reflected in the MDNR's Master Angler Program. The total number of muskellunge from Lake St. Clair entered for Master Angler Awards in 2003 exceeded 50 fish for the seventh consecutive year (Figure 11). The number of fish over 30 pounds remained above the numbers recorded prior to 1991. We believe that factors contributing to the consistent high quality of this fishery include: 1) a positive response to increased minimum size limits on both sides of the lake since the mid-1980's; 2) physical and biological changes in the lake such as clearer water and increased aquatic plant growth resulting in improved habitat for muskellunge; and, 3) increased voluntary catch and release fishing for muskies in Lake St. Clair by both sport and charter anglers.

Statistics from the Master Angler program also indicate that Lake St. Clair is the premier waterbody in the state for trophy smallmouth bass. Lake St. Clair accounted for 19% of all smallmouth bass entries in 2003 (catch/keep and catch/release programs combined). Since the early 1990's, both catch/keep and catch/release Master Angler smallmouth bass entries from Lake St. Clair have exhibited an increasing trend (Figure 12). Catch/release entries have outnumbered catch/keep entries for the last four years. The strong representation of Lake St. Clair smallmouth bass in the statewide Master Angler Program is likely a reflection of an abundance of trophy-size smallmouth bass in the lake, a high degree of angler effort targeting the species, and a strong catch-and-release ethic among smallmouth bass anglers.

## Commercial Fishery Summary

In 2003, two Michigan commercial fishing licenses were active on Lake Erie, but harvest was much reduced from previous years. The state licensed commercial seine operations in the shallow

embayments along Michigan's Lake Erie shoreline harvested 5 species of fish for a total of only 85,720 pounds (Table 5). In combination, common carp (76%), buffalo (11%) and channel catfish (9%) accounted for 96% of the total harvest by weight. The total value of the 2003 Lake Erie commercial harvest from Michigan waters was estimated at \$17,901.

## Summary of Netting Surveys

Since 1978, the MDNR has fished variable mesh multi-filament gill nets at two locations in western Lake Erie each fall, as part of the interagency yearling walleye assessment program. During 2003, a total of 171 walleye was caught in four net lifts. The total walleye catch-per-effort for the index sites (42.8) declined to the lowest level observed since the survey began in 1971, well below the mean annual catch per unit effort (cpue) of 121.5 for the time series (Table 6). The age 1 catch rate of 0.8 suggests that the 2002 year class is likely among the weakest in the time series. The combination of a very weak 2000 year class, a below average 2001 year class, and an extraordinarily weak 2002 year class will result in lower walleye abundance for Lake Erie walleye anglers. No trend in walleye growth is obvious from the mean length at age data for walleye taken in the fall index gill net survey.

The forage fish community of Lake St. Clair has been surveyed with bottom trawls each year since 1996 by the MDNR. A total of 22 trawl tows were conducted at the Anchor Bay index trawling site in 2003. The spring samples were dominated by spottail shiner and yellow perch (Table 7). The species with highest mean densities in the fall samples were spottail shiner, mimic shiner, and yellow perch. Densities of round gobies declined in 2003, with the fall density the lowest observed since the Lake St. Clair trawling survey was initiated in 1996. Yellow perch age-specific catch rates from the trawl survey indicate highly variable recruitment in Lake St. Clair (Table 8). Yellow perch recruitment in 1993, 1994, and 1998 was strong. Alternatively, recruitment was poor in 1992, 1995, 1999, and 2000.

In 2003, the MDNR surveyed the adult fish populations in Anchor Bay, Lake St. Clair with trap nets. Five trap nets were fished from May 28 to June 20. A total of 3,997 fish representing 24 species were captured during the survey. Rock bass were numerically dominant, accounting for 39% of the total (Figure 13). Other common





species in the nets included smallmouth bass, freshwater drum, channel catfish, and yellow perch.

Ages were estimated for smallmouth bass and walleye based on interpretation of scale samples. Age composition for those species is presented in Figure 14. The dominant walleye year class was the 1999 year class (Age 4), accounting for 30% of the total catch. The 1998 year class (Age 5) accounted for 57% of the smallmouth bass catch. A total of 173 walleye and 830 smallmouth bass were tagged and released at the Anchor Bay trap net site in 2003.

The length frequency of smallmouth bass captured in the trap nets reflects the dominance of the 1998 year class (Figure 15). Smallmouth bass less than legal size (356 mm or 14 inches total length) made up 58% of the catch in 2002, but accounted for only 27% of the catch in 2003. This shift is a result of the growth of individuals of the dominant 1998 year class beyond the minimum size limit during the past year. The mean age for 19 inch (10 years) and 20 inch (11 years) smallmouth bass indicates the importance of older fish in the population for providing anglers with the opportunity to catch trophy size smallmouth bass.

The trap net survey revealed an abundant population of channel catfish in Anchor Bay dominated by trophy size individuals. The average weight of all channel catfish captured during the survey was 6.8 pounds. Over 22% of the channel catfish captured in the trap nets exceeded the minimum size requirement (27 inches total length) for the MDNR Master Angler program. Although anglers are discouraged from keeping large channel catfish for food due to consumption advisories, catch-and-release trophy channel catfish angling opportunities are clearly available in Anchor Bay during the spring. The high abundance of large fish suggests that this channel catfish population is currently experiencing low exploitation.

In 2002, some muskellunge captured during the Lake St. Clair trap net survey exhibited raised, reddish, sores. Molecular analysis revealed that these fish were infected with a *Piscirickettsia* bacterium. This type of bacteria has not previously been isolated from muskellunge or other fish species in the Great Lakes. Additional testing of muskie from Lake St. Clair in 2003, found that all muskies tested were infected with

the bacteria. The fish sampled included both visibly sick (bearing external lesions) as well as apparently healthy individuals (no external symptoms). Thus it appears that exposure to the organism has been widespread among the muskie population of the lake. However, muskies with external lesions were characterized by high numbers of the bacteria, while low numbers of bacteria were found in the apparently healthy fish. It is unknown if these fish were recently infected or perhaps even recovering from the infection. The ecological effect of the bacteria on the muskie population and the rest of the fish community in Lake St. Clair is unknown. In 2004, additional sampling will be conducted, with an emphasis on determining what other species in the lake may be infected by this bacteria. MDNR will also continue to monitor the rate of external symptoms in Lake St. Clair muskies. Anglers who want to minimize the chance of spreading the infection among fish they catch and release are encouraged to clean their baits, landing nets, and boat decks with a solution of dilute household bleach (1/4 cup per gallon).

A total of 38 lake sturgeon were collected during assessment surveys on Lake St. Clair in 2003. Sturgeon captured averaged 52.2 inches in total length, with a range from 36 inches to 64 inches. Ages were estimated for 33 sturgeon based on pectoral fin ray sections. Thirty-seven year-classes were represented with ages ranging from 9 to 45 years. Combined age samples from 1997-2003 indicate that survival of lake sturgeon spawned in the 1970's and 1980's has been fairly consistent, but lake sturgeon spawned in the 1950's and 60's are less abundant (Figure 16). This may be a result of improved water quality after the Clean Water Act of 1972. Restrictive lake sturgeon sport fishing regulations implemented in 1983 by Michigan could also be a factor in the increased survival. A total of 35 lake sturgeon were tagged on the dorsal fin with numbered metal tags and released.

## Fish Tagging Studies

In 2003, a total of 4,275 walleye were tagged with non-reward tags by Ontario, Ohio, Pennsylvania, New York, and Michigan at eight Lake Erie sites. A total of 174 non-reward tags placed on fish in 2003 were recovered by fishermen for a single season reporting rate of 4.1%. The 2003 site-specific reporting rate varied from a high of 6.3% at the Maumee River site in Ohio, to a low of 1.5% for the Van Buren

Bay site in New York. The interagency tagging study continues to provide evidence of substantial movement of walleye from spawning locations in Lake Erie through the St. Clair connecting waters (Figure 17).

Legal size walleye (173 fish) and smallmouth bass (830 fish) captured in survey trap nets in Anchor Bay during May and June, 2003 were tagged and released. A total of 21 walleye and 5 smallmouth bass tagged in 2003 were recovered by anglers and reported to MDNR. A map showing the geographical distribution of walleye tag recoveries in 2003 for walleye tagged in Anchor Bay is presented in Figure 18. On average, recaptured walleyes tagged in 2002 had traveled 27.3 km from the Anchor Bay tag site, while those tagged in 2003 had traveled 14.1 km. The tagged walleye recovered by anglers averaged slightly smaller in total length at tagging compared to the tagged population. This difference suggests that the largest individuals were either subject to slightly higher natural mortality or were less vulnerable to capture. The seasonal pattern of walleye tag recoveries differed for the two tag years. Most recoveries for walleye tagged in 2003 were reported for summer months and came from Lake St. Clair or the St. Clair River. In contrast, recoveries in 2003 of walleye tagged in Anchor Bay in 2002 included 3 fish caught in the Detroit River and 1 fish caught in the Maumee River, Ohio. This pattern of recoveries suggests a substantial annual migration of walleye from Lake Erie northward into and through the St. Clair system during the summer and returning to Lake Erie by the following spring.

There was a large difference in the tag reporting rate between walleye (12.1%) and smallmouth bass (0.6%). Some of this difference is likely due to higher angler exploitation for walleye. However, it is too early in the tagging portion of the study to evaluate how important variation in angler response was between the two species. The 2002 Lake St. Clair creel survey documented that only about 12,000 smallmouth bass were harvested from a total catch of over 148,000 legal size bass. This high proportion of catch-and-release fishing may have accounted for a portion of the lower tag detection and/or reporting. Alternatively, tag loss rates or natural mortality rates for smallmouth bass tagged in Lake St. Clair may be much higher than for walleye.

A total of 1,236 lake sturgeon have been tagged and released on the St. Clair River and Lake St. Clair since 1996. To date, fifty-nine tagged lake sturgeon recaptures have been reported. Twenty-one have been recovered with survey setlines in the North Channel. Three were recovered in survey trap nets in Anchor Bay during spring 2003. Ten recoveries were reported by sport anglers, including a reported recovery from Lake Erie near Huron, Ohio. Seventeen recoveries have been reported from the Ontario commercial trap net fishery in southern Lake Huron, approximately 70 km from the tag site. All other recaptures have occurred within 10 km of the tag sites. Although trawling has accounted for the capture of 60% of the sturgeon tagged and released during this study, only ten recoveries (17%) have been from a fish originally caught in a trawl on Lake St. Clair. This may be an indication that fish residing year round in the St. Clair River, or moving north into southern Lake Huron, experience a higher level of fishing exploitation.

## Water Levels

After nearly 30 years of above average water levels, anglers and boaters have experienced below average water levels in the connecting waters and Lake Erie during the last five years. Water levels in the connecting waters are expected to be 2 to 4 inches higher in 2004 than last year, but will remain below the long term average. Lower water levels may prove an impediment to sport anglers by restricting boat launching and boat travel to some traditional fishing areas. The effect of lower water levels on fish populations is uncertain. Short-term impacts may be negative. For example, northern pike spawning may be negatively impacted because coastal wetlands are dewatered. Bass spawning beds could also be more visible and more vulnerable to bass anglers. However, low water levels can result in recovery of lost coastal wetland areas. In Lake St. Clair, recovery of beds of emergent rushes is already apparent. Unfortunately, invasive common reed (*Phragmites australis*) has also expanded its distribution in the St. Clair Flats area during this period of low water. When water levels return to average or higher, increased coastal wetland habitat will positively impact many of the fish species in the connecting waters.

## Sport Fishing Regulations

Walleye in Lake Erie are managed cooperatively with other jurisdictions under a harvest quota system. Reduced spawning success for walleye in Lake Erie has resulted in lower adult walleye abundance in recent years and this trend appears likely to continue. Consequently, walleye harvest quotas will be lower for several years. As a result, regulations for walleye fishing in Michigan's waters of Lake Erie will be more restrictive, beginning in April 2004. The daily bag limit has been reduced to 5 fish, while the walleye minimum size limit has been increased to 15 inches. In addition, the walleye season will be closed during April and May. Collectively, these changes will reduce the Michigan walleye harvest in Lake Erie sufficiently to remain within the quota.

Lake sturgeon fishing regulations were revised by the MDNR in 1999. Effective, April 1, 1999, harvesting of lake sturgeon was prohibited from Michigan's Great Lakes and connecting waters, except for the St. Clair River and Lake St. Clair. On the St. Clair River and Lake St. Clair, regulations include a "slot" size limit, with a minimum length limit of 1,067 mm (42 inches) and a maximum length limit of 1,270 mm (50 inches), a season bag limit of 1 fish, an open season from July 16 to September 30, and mandatory registration of harvested sturgeon at designated check stations. This "slot" limit will allow a limited harvest to continue, while protecting sexually mature female fish, and potentially allowing older fish to increase in abundance. Since 1999, a total of thirteen harvested fish have been registered. All were reportedly caught in the North Channel of the St. Clair River.

The open season for smallmouth and largemouth bass fishing in the Michigan portion of the connecting waters (St. Clair River, Lake St. Clair, and Detroit River) is the third Saturday in June to December 31. In recent years, "preseason" fishing for bass has become increasingly popular on these waters. Many anglers are apparently unaware that it is a violation of the Natural Resources and Environmental Protection Act to fish for smallmouth bass during the closed season (Public Act 451 of 1994, Part 487, Sec. 324.48716), even if the angler intends to release any bass caught. The objective of the season closure is to protect bass during the pre-spawning and spawning periods when they are particularly vulnerable to overexploitation. Male bass guard the nest and protect the eggs and fry from

predation by other fish. Removal of nest guarding males for just a minute or two has been documented to increase egg and fry predation. In 2004, low water levels may make spawning bass more visible and thus more vulnerable to fishing in Lake St. Clair. We urge bass anglers to show restraint and comply with the existing fishing regulations on the connecting waters.

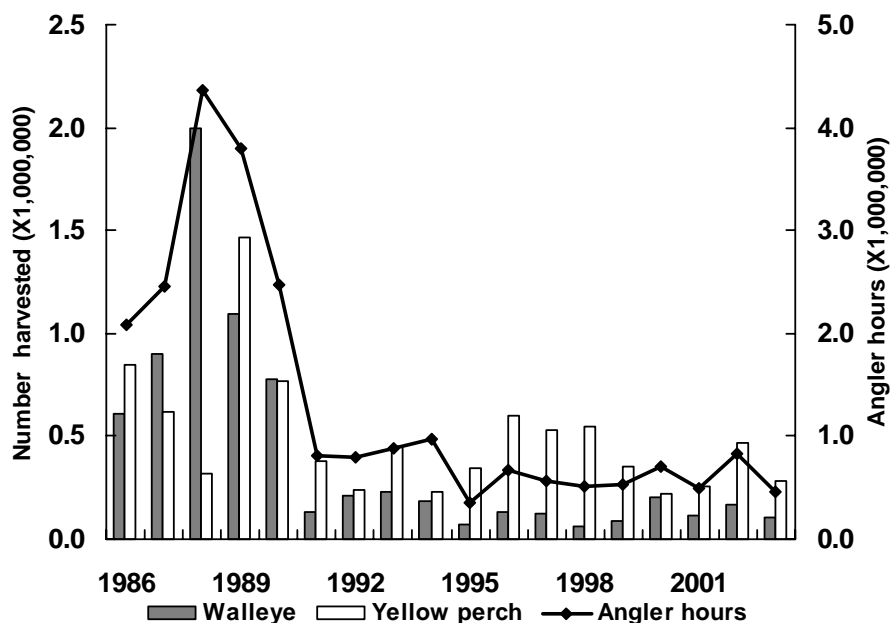


Figure 1.—Estimated harvest and effort for Michigan's Lake Erie sport fishery, 1986-2003.

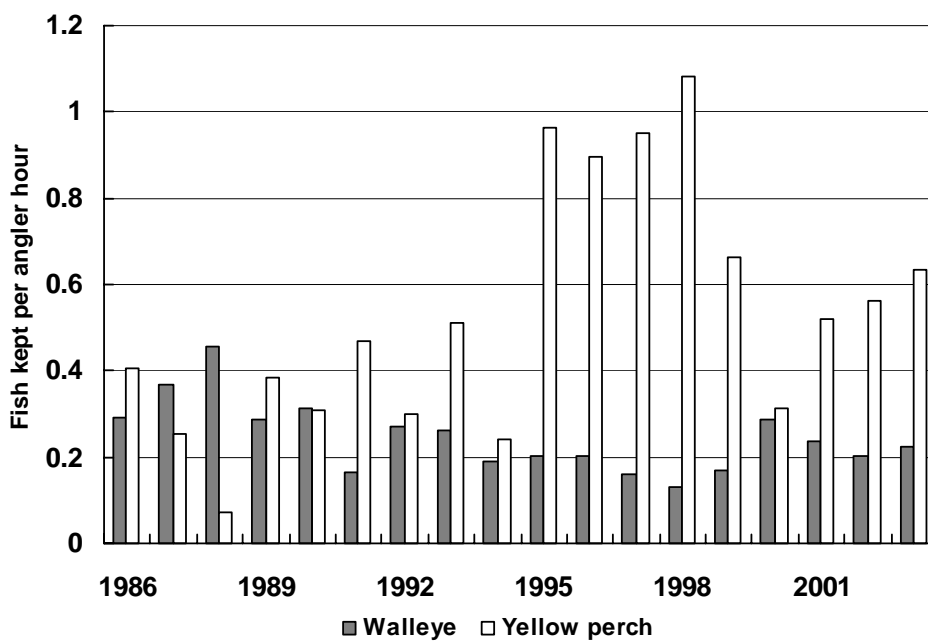


Figure 2.—Walleye and yellow perch catch rates for Michigan's Lake Erie sport fishery, 1986-2003.



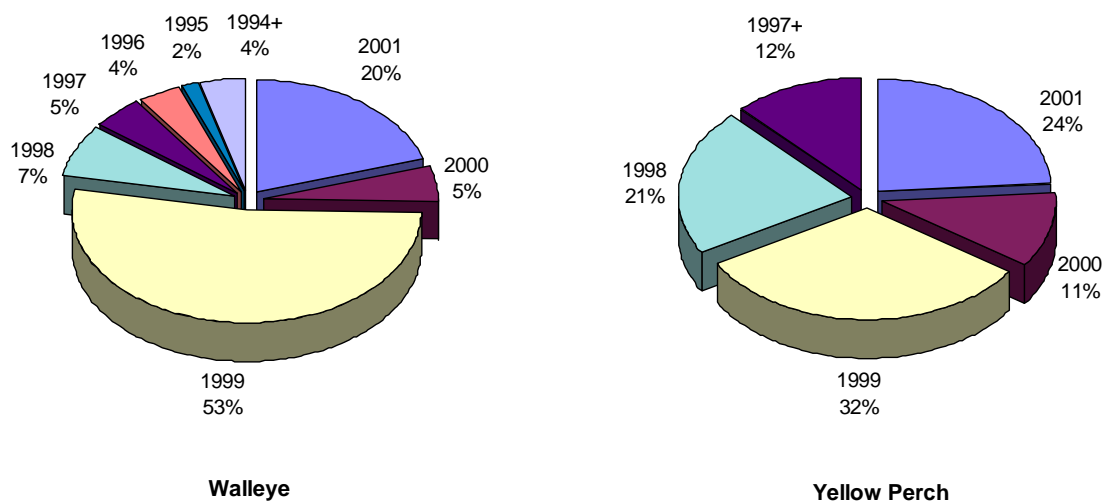


Figure 3. —Year-class contribution to Michigan sport harvest for walleye and yellow perch from Lake Erie in 2003.

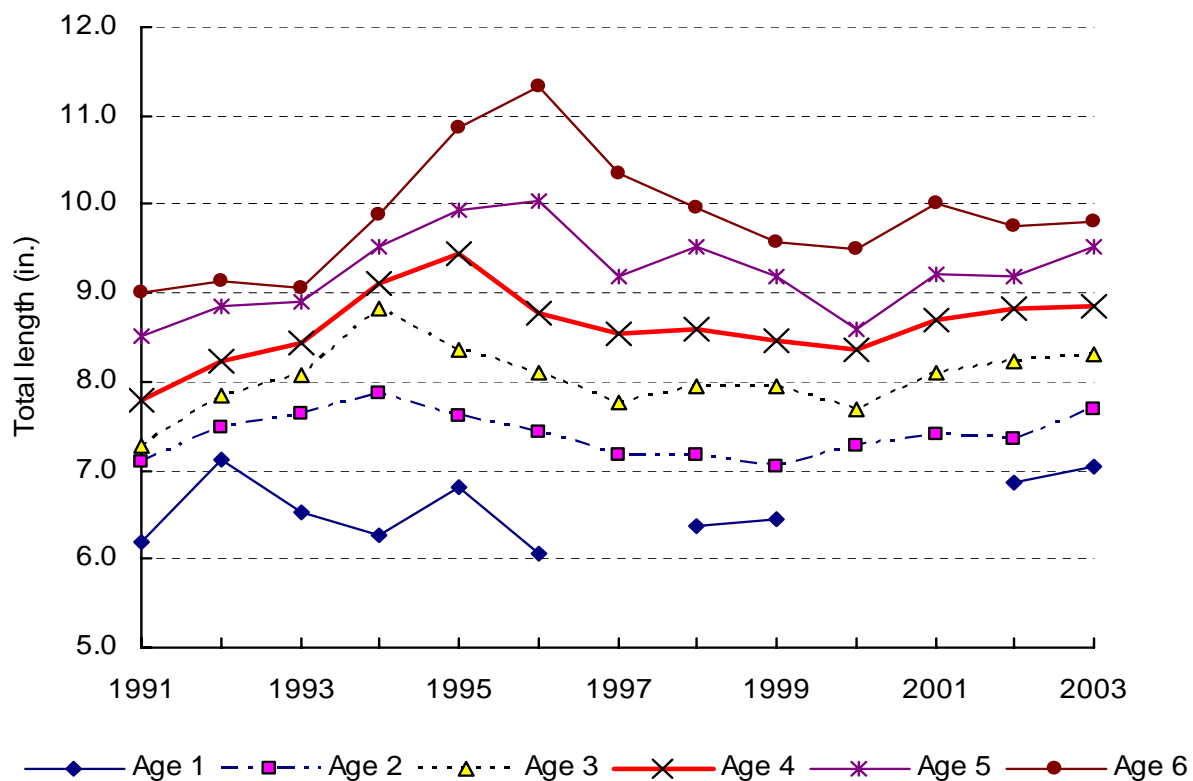


Figure 4. —Mean length at age for sport caught yellow perch from Michigan's waters of Lake Erie, 1991-2003.

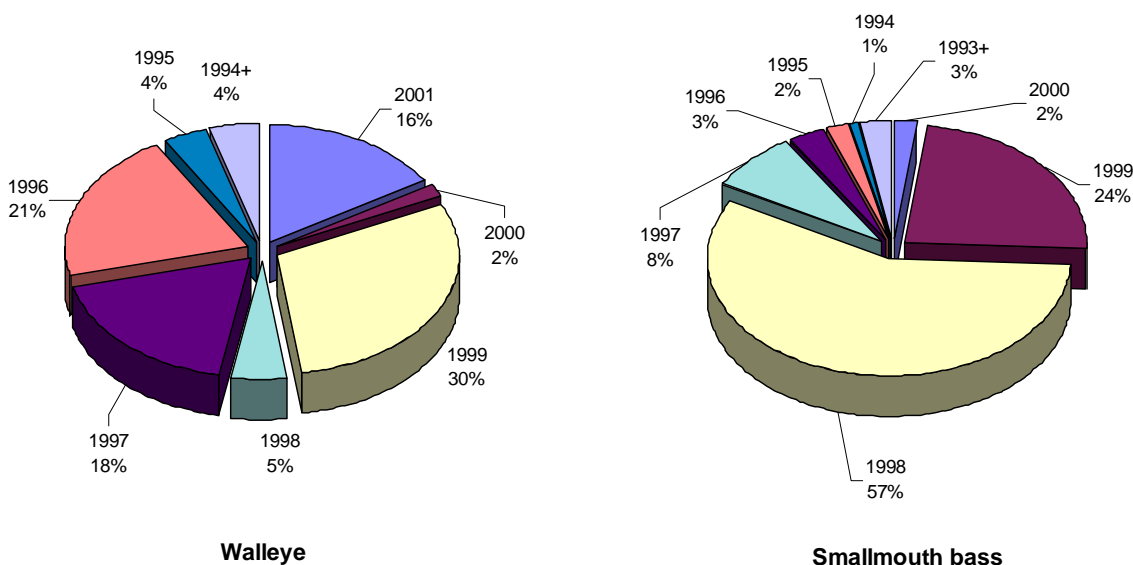


Figure 5. —Year-class contribution to Michigan sport harvest for walleye and smallmouth bass from Lake St. Clair in 2002.

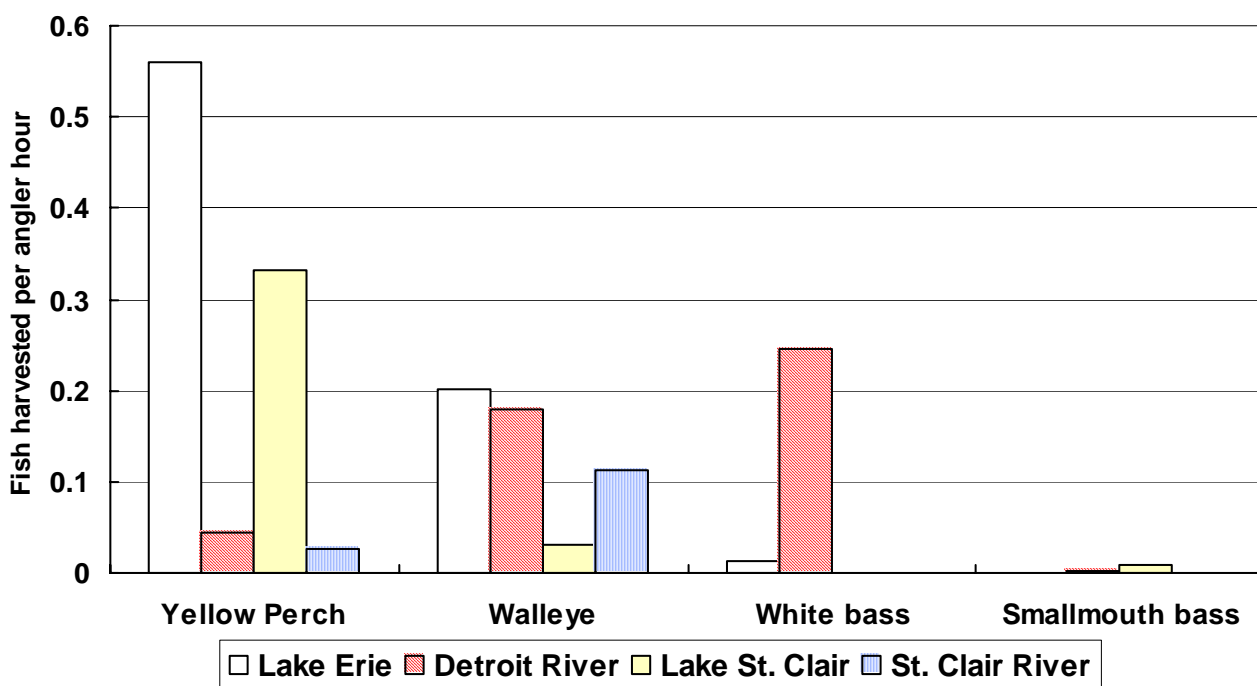


Figure 6.— Harvest rates for yellow perch, walleye, white bass, and smallmouth bass for Southeast Michigan Great Lakes sport fisheries in 2002.

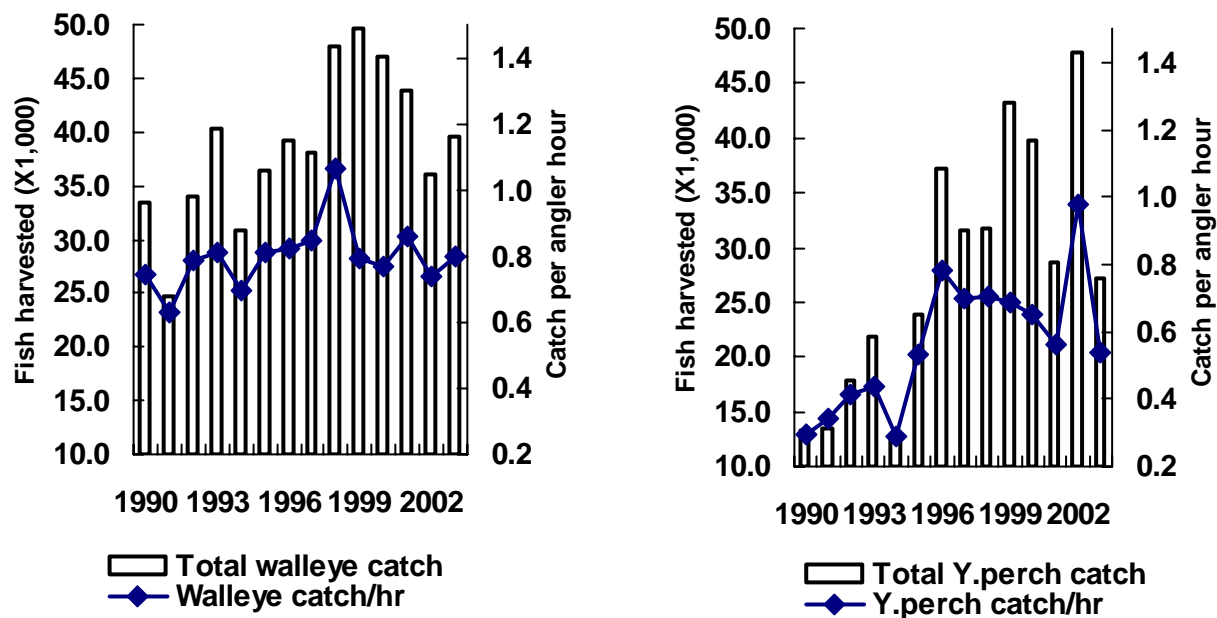


Figure 7. —Michigan charter boat harvest and catch rates for Lake Erie, 1990-2003.

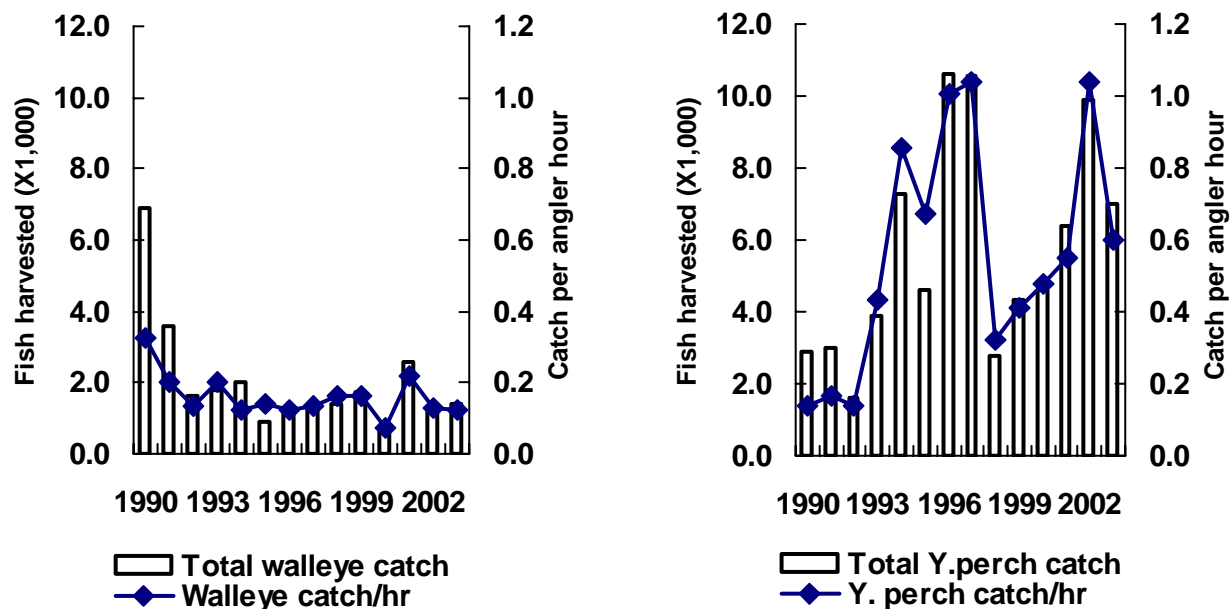


Figure 8. —Michigan charter boat harvest and catch rates for Lake St. Clair, 1990-2003.

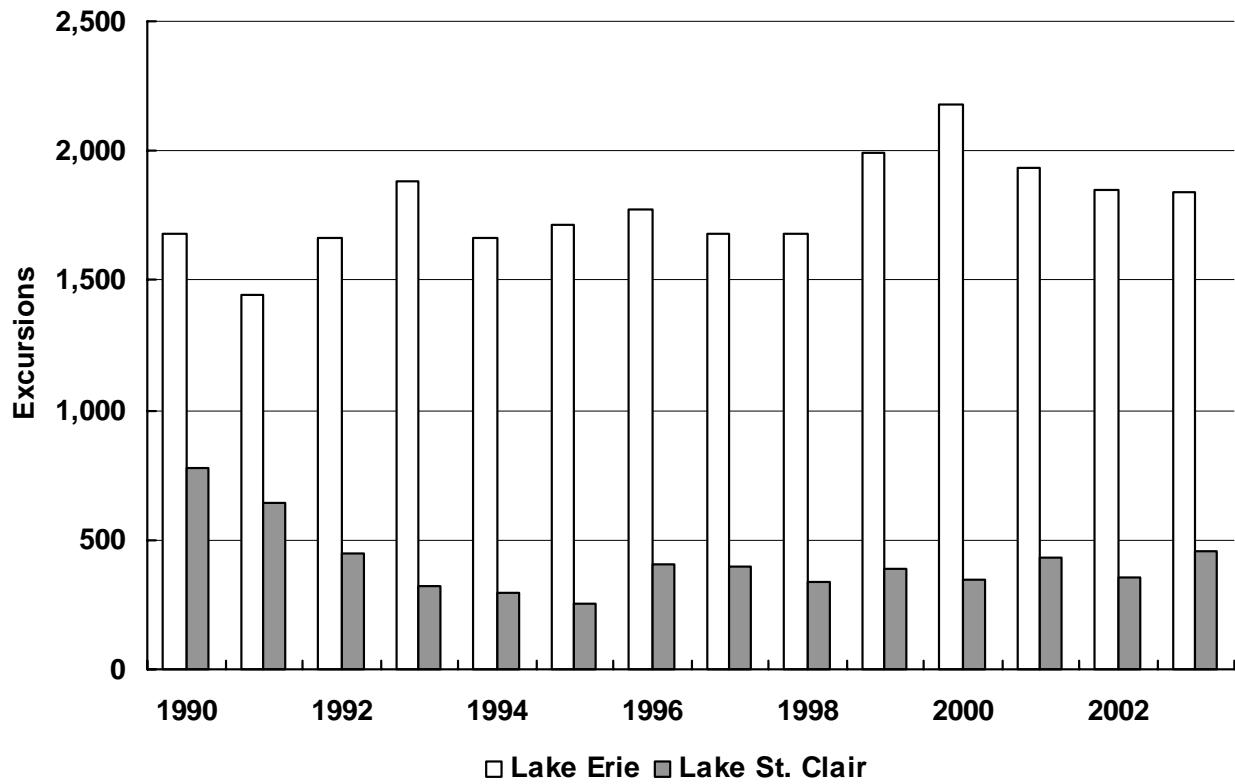


Figure 9. —Reported charter boat excursions on Lake Erie and Lake St. Clair, 1990-2002.

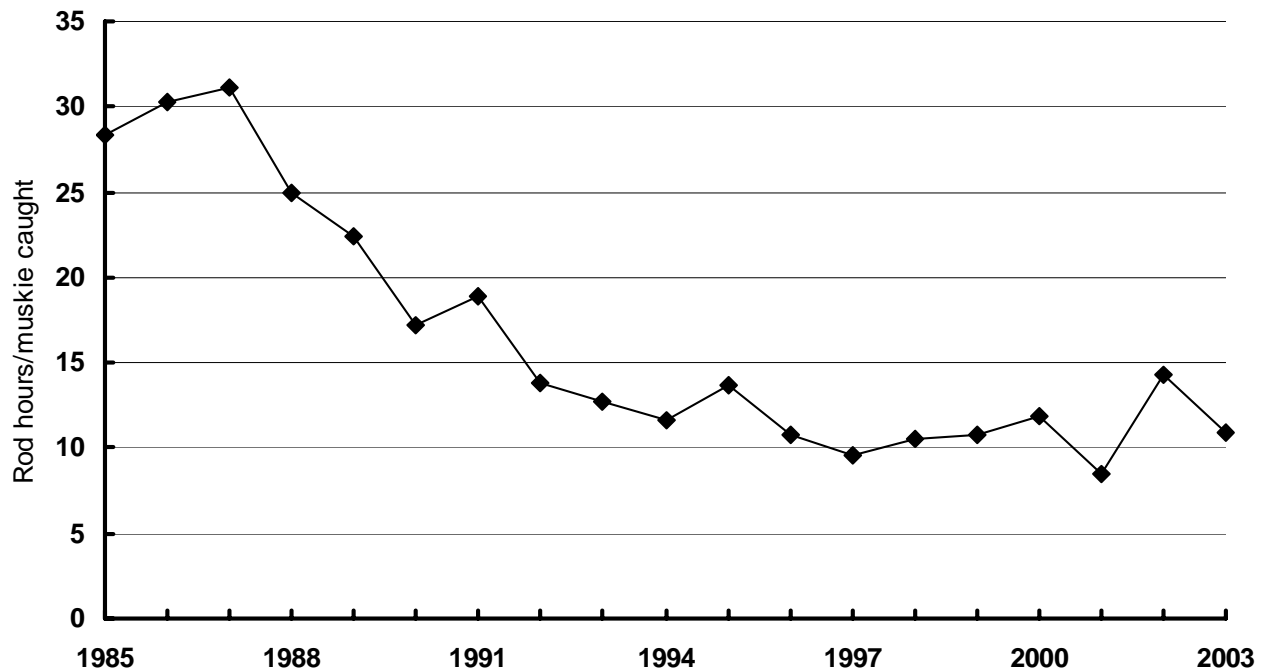


Figure 10. —Lake St. Clair muskellunge catch rate from Angler Diary Program, 1985-2003.

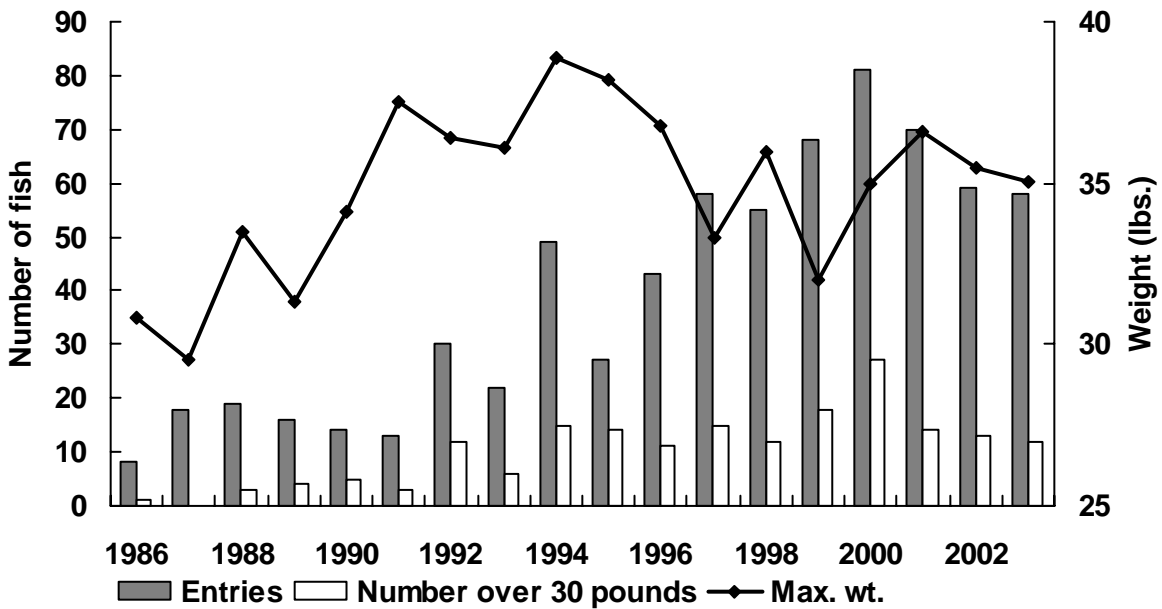


Figure 11. —Lake St. Clair muskellunge entered in the Michigan DNR Master Angler Program, 1986-2003. Values for 1992-2002 represent combined regular and catch-and-release Master Angler categories.

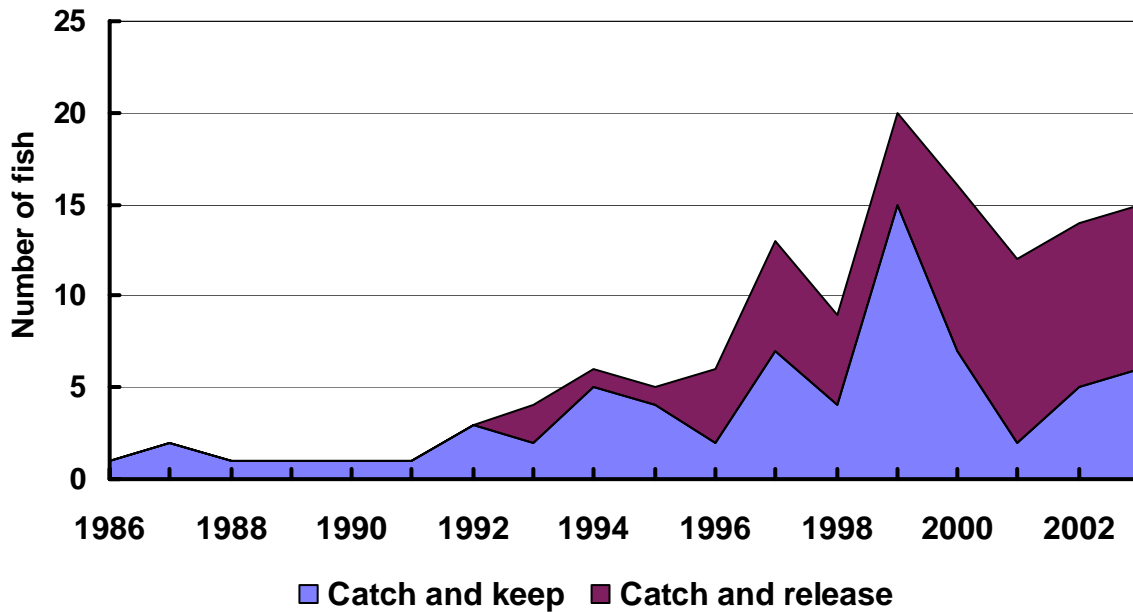


Figure 12. —Lake St. Clair smallmouth bass entered in the Michigan DNR Master Angler Program, 1986-2003. Values for 1992-2003 represent combined regular and catch-and-release Master Angler categories.



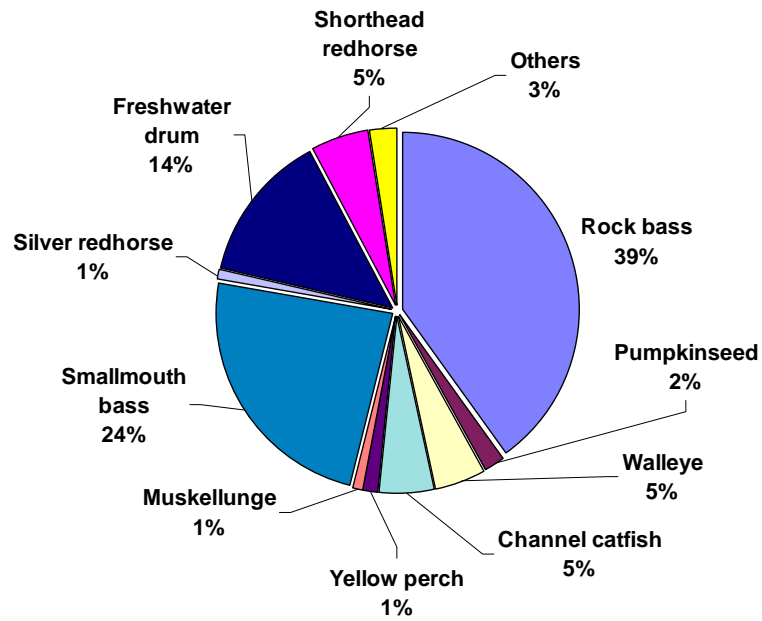


Figure 13. —Catch composition for trap nets fished in Lake St. Clair in May 2003.

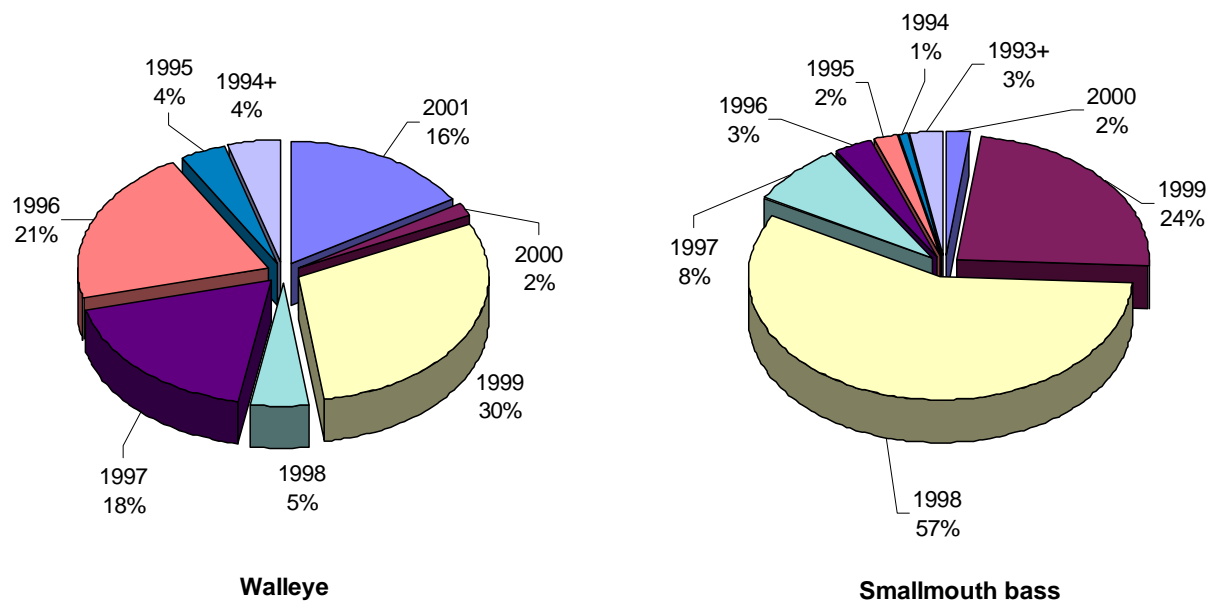


Figure 14. —Year-class contribution for walleye (n=180) and smallmouth bass (n=941) caught in Lake St. Clair trap nets in 2003.

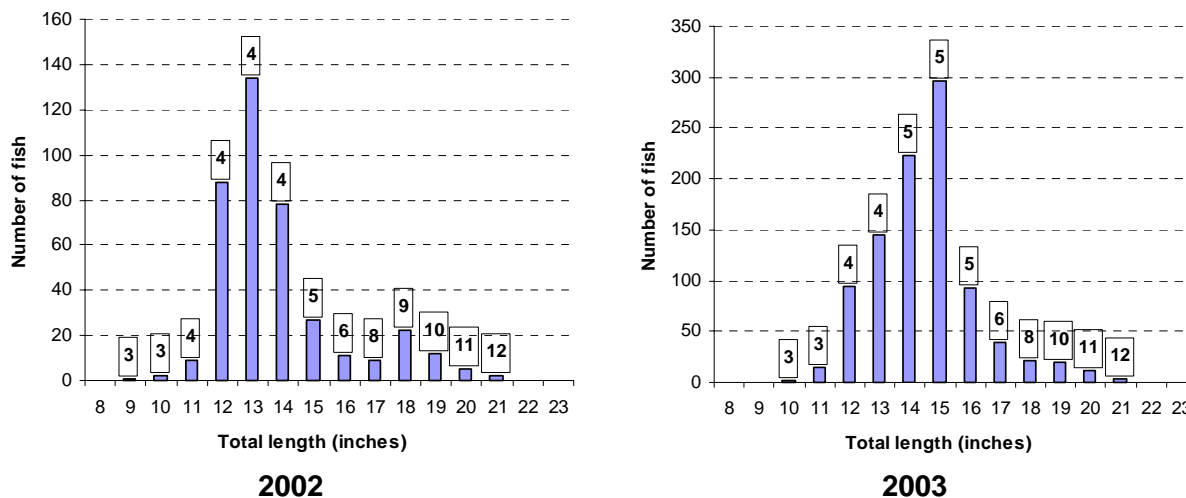


Figure 15. Length frequency of Lake St. Clair smallmouth bass caught in survey trap nets during spring 2002 and 2003. Mean age by inch group is shown in box above corresponding length bar.

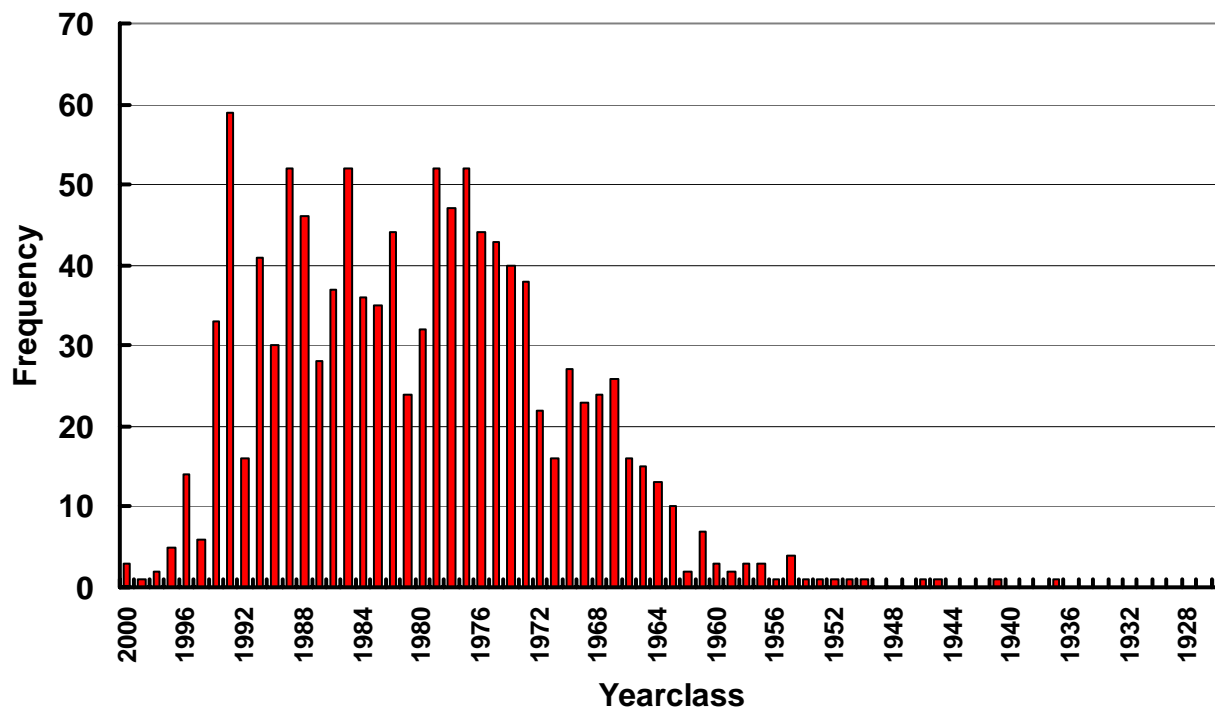


Figure 16. —Year of hatching for lake sturgeon sampled from Lake St. Clair and St. Clair River from 1997 to 2003 by Mt. Clemens Research Station (n=1139).

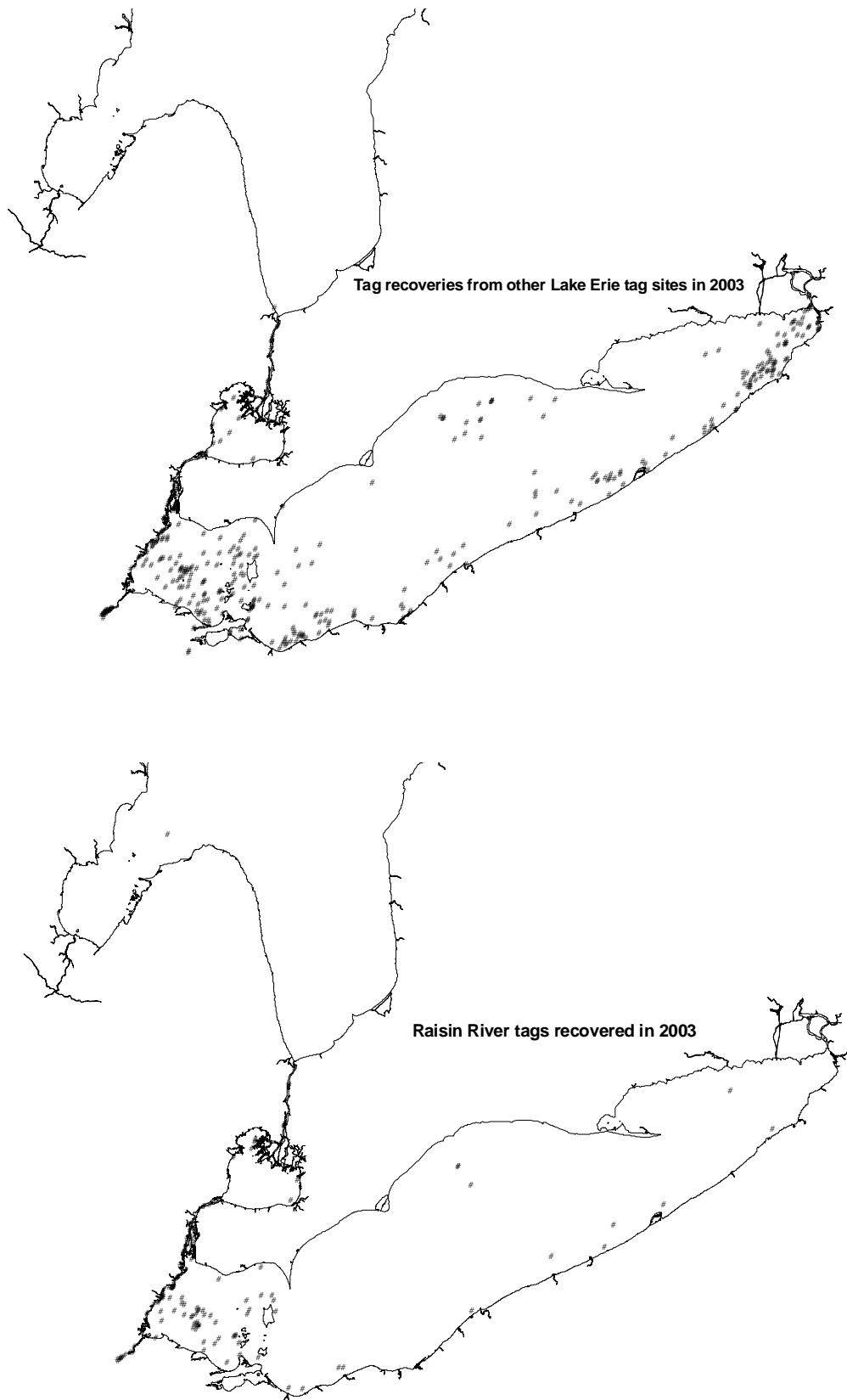
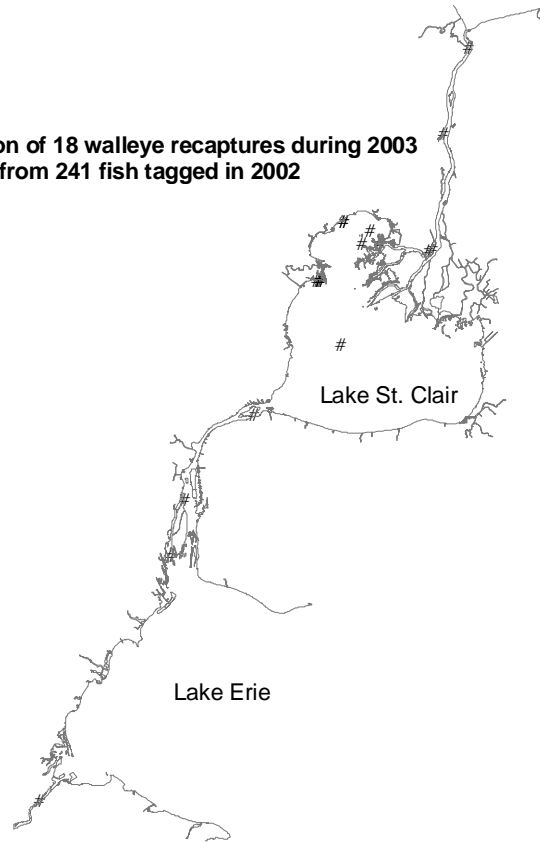


Figure 17.-Geographical distribution of walleye tag recoveries in 2003 from fish tagged during all years at Monroe (135 recoveries in 2003; bottom map) and other Lake Erie tag sites (392 recoveries in 2003; top map).

**Distribution of 18 walleye recaptures during 2003  
from 241 fish tagged in 2002**



**Distribution of 21 walleye recaptures during 2003  
from 173 fish tagged in 2003**

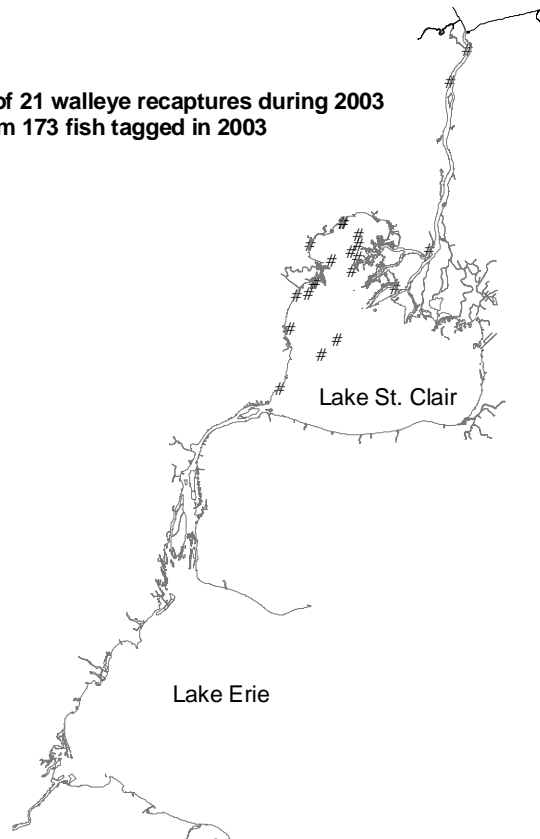


Figure 18.-Geographical distribution of walleye tag recoveries in 2003 from fish tagged during 2002 (top) and 2003 (bottom) at the Anchor Bay site in Lake St. Clair.

Table 1. —Estimated sport harvest, catch rate, and effort for Michigan's 2003 Lake Erie non-charter boat fishery. Two standard errors in parentheses.

Species	Harvest per hour	Month							
		Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Yellow perch	0.6342 (0.2711)	38 (293)	1,578 (3,389)	20,925 (40,710)	29,055 (43,950)	99,286 (60,013)	98,844 (62,423)	36,727 (49,804)	286,453 (116,530)
Walleye	0.2260 (0.0795)	844 (1,191)	4,569 (4,790)	69,341 (30,008)	20,413 (12,441)	6,562 (5,567)	320 (565)	19 (122)	102,068 (33,331)
Channel catfish	0.0284 (0.0593)	311 (655)	1,395 (2,567)	4,547 (17,840)	3,110 (16,961)	1,895 (7,662)	1,153 (3,994)	437 (5,126)	12,848 (26,719)
White bass	0.0221 (0.0676)	1,069 (2,876)	1,362 (3,305)	5,006 (29,865)	1,099 (3,281)	801 (2,047)	555 (1,984)	80 (339)	9,972 (30,498)
White perch	0.0043 (0.0073)	0 (0)	51 (240)	377 (1,165)	237 (642)	1,074 (2,897)	88 (493)	111 (458)	1,938 (3,267)
Freshwater drum	0.0032 (0.0069)	12 (51)	188 (1,324)	461 (2,302)	457 (1,424)	254 (767)	67 (359)	10 (58)	1,449 (3,131)
Smallmouth bass	0.0009 (0.0019)	0 (0)	124 (590)	68 (356)	155 (450)	178 (45)	9 (61)	0 (0)	1,185 (2,951)
Largemouth bass	0.0008 (0.0039)	0 (0)	298 (1,752)	0 (0)	11 (123)	45 (179)	0 (0)	0 (0)	354 (1,765)
Bluegill	0.0006 (0.0070)	0 (0)	31 (224)	0 (0)	190 (1,261)	65 (2,880)	7 (133)	0 (0)	293 (3,155)
Rock bass	0.0004 (0.0012)	0 (0)	7 (36)	66 (428)	44 (235)	0 (0)	32 (173)	33 (183)	182 (551)
Black crappie	0.0004 (0.0017)	48 (310)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	125 (720)	173 (784)
Lake whitefish	0.0004 (0.0021)	0 (0)	0 (0)	165 (930)	0 (0)	0 (0)	0 (0)	0 (0)	165 (930)
Rainbow trout	0.0000 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	15 (102)	0 (0)	0 (0)	15 (102)
Angler hours		8,133 (4,771)	24,440 (11,692)	166,544 (42,077)	99,652 (30,630)	78,136 (14,460)	52,943 (19,250)	21,798 (7,800)	451,646 (59,234)
Angler trips		1,989 (1,168)	5,446 (2,487)	32,980 (8,809)	20,879 (6,474)	16,725 (3,116)	11,535 (4,199)	5,061 (1,965)	94,615 (12,580)
Angler days		1,959 (1,147)	5,369 (2,461)	32,772 (8,775)	20,704 (6,470)	16,688 (3,107)	11,453 (4,175)	5,061 (1,965)	94,006 (12,537)



Table 2. —Estimated effort, harvest, and harvest rate for Michigan's 2002 recreational fishery (non-charter boat fishery) on the Detroit River, Lake St. Clair, and the St. Clair River. Estimated catch, including harvest and legal-size fish caught and released is also presented for selected species. Two standard errors in parentheses.

Species	Detroit River			Lake St. Clair			St. Clair River		
	Harvest per hour	Harvest	Catch	Harvest per hour	Harvest	Catch	Harvest per hour	Harvest	Catch
Walleye	0.1823 (0.0650)	159,211 (55,411)	165,723 (57,108)	0.0307 (0.0173)	41,972 (23,406)	46,361 (30,388)	0.1132 (0.0780)	19,301 (13,200)	20,093 (13,875)
Yellow perch	0.0439 (0.0712)	38,353 (62,126)	N/A	0.3329 (0.1505)	455,621 (202,133)	N/A	0.0272 (0.0969)	4,461 (16,519)	N/A
White bass	0.2467 (0.1646)	215,476 (142,772)	285,639 (158,716)	0.0005 (0.0018)	664 (2,413)	4,215 (6,751)	0.0000 (0.0000)	0 (0)	0 (0)
White perch	0.0046 (0.0092)	4,031 (7,999)	N/A	0.0001 (0.0003)	103 (383)	N/A	0.0000 (0.0000)	0 (0)	N/A
Smallmouth bass	0.0016 (0.0060)	1,434 (5,270)	31,828 (27,884)	0.0088 (0.0128)	12,099 (17,487)	148,182 (198,752)	0.0010 (0.0040)	175 (675)	6,268 (15,341)
Largemouth bass	0.0006 (0.0032)	512 (2,797)	7,761 (13,866)	0.0005 (0.0010)	684 (1,428)	27,074 (48,824)	0.0004 (0.0043)	67 (730)	534 (1,413)
Northern pike	0.0006 (0.0019)	525 (1,640)	2,861 (5,654)	0.0011 (0.0045)	1,483 (6,177)	7,982 (13,752)	0.0014 (0.0052)	0 (0)	246 (882)
Muskie	0.0001 (0.0007)	113 (572)	973 (2,546)	0.0001 (0.0004)	154 (505)	1,783 (2,677)	0.0001 (0.0011)	11 (192)	68 (413)
Rock bass	0.0066 (0.0168)	5,746 (14,673)	N/A	0.0062 (0.0080)	8,507 (10,923)	N/A	0.0002 (0.0015)	39 (252)	N/A
Bluegill	0.0056 (0.0196)	4,855 (17,130)	N/A	0.0074 (0.0086)	10,074 (11,789)	N/A	0.0039 (0.0411)	666 (7,006)	N/A
Pumpkin-seed	0.0010 (0.0054)	914 (4,685)	N/A	0.0017 (0.0016)	2,383 (2,221)	N/A	0.0006 (0.0070)	103 (1,188)	N/A
Channel catfish	0.0006 (0.0026)	536 (2,228)	N/A	0.0005 (0.0023)	713 (3,096)	N/A	0.0000 (0.0000)	0 (0)	N/A
Freshwater drum	0.0017 (0.0055)	1,445 (4,810)	N/A	0.0008 (0.0016)	1,072 (2,252)	N/A	0.0000 (0.0000)	0 (0)	N/A
Coho salmon	0.0000 (0.0000)	0 (0)	0 (0)	0.0000 (0.0000)	0 (0)	0 (0)	0.0002 (0.0006)	28 (107)	39 (220)
Chinook salmon	0.0000 (0.0000)	0 (0)	0 (0)	0.0000 (0.0000)	0 (0)	0 (0)	0.0003 (0.0013)	48 (229)	48 (229)
Brown trout	0.0000 (0.0000)	0 (0)	0 (0)	0.0000 (0.0000)	9 (44)	9 (44)	0.0001 (0.0004)	10 (63)	10 (63)
Rainbow trout	0.0000 (0.0000)	0 (0)	0 (0)	0.0000 (0.0000)	0 (0)	0 (0)	0.0003 (0.0037)	17 (103)	50 (634)
Angler hours	873,388 (67,863)			1,368,564 (119,480)			170,514 (14,336)		

Table 3. —Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Erie, 2003.

Species	Total catch per hour	Total catch per excursion	Month							Season
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Rainbow trout	0.000	0.007	0	1	4	2	5	0	0	12
Yellow perch	0.549	14.822	3	103	1,360	1,532	10,645	11,521	2,078	27,242
Walleye	0.799	21.561	1,036	2,795	23,540	10,515	689	1,054	0	39,629
Other	0.038	1.039	5	131	661	789	48	37	238	1,909
Angler hours			2,712	4,741	23,469	12,222	3,554	2,311	611	49,619
Angler trips			342	726	4,557	2,285	670	475	106	9,161
Anglers										
Resident			35	360	4,054	1,922	583	407	81	7,442
Nonresident			3	86	493	307	84	68	23	1,064
Charter excursions			88	156	890	451	134	92	27	1,838

Table 4. —Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake St. Clair and the St. Clair River, 2003.

Species	Total catch per hour	Total catch per excursion	Month							Season
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Chin. salmon	0.000	0.002	1	0	0	0	0	0	0	1
Brown trout	0.000	0.002	0	0	1	0	0	0	0	1
Yellow perch	0.600	15.242	0	39	657	1,151	1,230	1,871	2,048	6,996
Walleye	0.121	3.070	55	204	321	523	246	60	0	1,409
Other	0.457	11.619	0	0	1,429	1,382	1,741	519	262	5,333
Angler hours			96	340	2,119	3,503	2,905	1,804	896	11,663
Angler trips			16	67	341	548	426	276	147	1,821
Anglers										
Resident			13	67	286	499	344	249	137	1,595
Nonresident			3	0	55	49	82	27	10	226
Charter excursions			9	14	92	138	109	64	33	459

Table 5. —Commercial harvest from Michigan waters of Lake Erie in 2003.

	Carp	Buffalo	Channel catfish	Quillback	Bullheads	Total
Harvest (lbs.)	65,020	9,350	7,940	2,500	900	85,710
% of total	76	11	9	3	1	100
Market value	\$7,838	\$4,675	\$4,619	\$500	\$270	\$17,901

Table 6. —Walleye CPUE (number per net lift) in multi-filament gill nets during fall surveys on Michigan waters of Lake Erie.

Year Class	Total CPUE	Survey year																	
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1975	42.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1976	18.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1977	171.0	0.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1978	61.6	1.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1979	72.4	0.5	0.5	0.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1980	92.7	2.3	0.5	0.3	0.0	0.3	—	—	—	—	—	—	—	—	—	—	—	—	—
1981	72.3	2.8	2.3	0.5	0.3	0.0	—	—	—	—	—	—	—	—	—	—	—	—	—
1982	306.2	44.3	28.5	5.3	7.5	3.5	0.5	—	—	—	—	—	—	—	—	—	—	—	—
1983	34.6	4.0	5.0	3.5	1.8	1.8	2.0	—	—	—	—	—	—	—	—	—	—	—	—
1984	147.7	34.3	20.5	3.5	8.0	8.3	2.0	0.5	0.3	0.5	—	—	—	—	—	—	—	—	—
1985	177.2	98.0	42.5	9.3	14.3	8.5	1.5	1.3	0.8	1.0	—	—	—	—	—	—	—	—	—
1986	297.5	—	96.8	30.3	90.3	43.5	19.5	11.0	3.8	2.0	0.3	—	—	—	—	—	—	—	—
1987	127.8	—	—	4.5	53.8	26.8	20.0	13.8	2.5	3.8	1.0	0.5	0.8	—	0.3	—	—	—	—
1988	125.0	—	—	—	61.5	35.8	9.3	7.3	4.5	4.5	0.5	0.8	0.8	—	—	—	—	—	—
1989	52.6	—	—	—	—	16.0	17.0	10.0	2.8	3.3	1.3	0.8	0.8	0.3	0.3	—	—	—	—
1990	136.4	—	—	—	—	—	54.5	48.0	13.0	16.5	1.5	1.3	1.3	0.0	0.3	—	—	—	—
1991	194.3	—	—	—	—	—	—	63.0	47.3	61.5	11.3	6.8	2.8	1.3	0.3	—	—	—	—
1992	16.7	—	—	—	—	—	—	—	2.0	7.3	2.0	0.3	1.5	2.3	1.0	0.3	—	—	—
1993	169.7	—	—	—	—	—	—	—	—	73.3	71.0	11.8	8.08	3.3	1.5	0.3	0.5	—	—
1994	130.5	—	—	—	—	—	—	—	—	—	63.3	43.0	14.0	4.8	2.8	1.8	0.8	—	—
1995	8.3	—	—	—	—	—	—	—	—	—	—	3.3	1.3	0.8	1.0	0.8	0.8	0.3	—
1996	178.2	—	—	—	—	—	—	—	—	—	—	—	37.5	84.3	30.5	13.3	9.8	1.8	1.0
1997	128.2	—	—	—	—	—	—	—	—	—	—	—	—	54.3	34.3	20.3	15.3	3.0	1.0
1998	77.6	—	—	—	—	—	—	—	—	—	—	—	—	—	26.0	29.5	14.8	6.3	1.0
1999	157.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57.0	73.3	21.5	5.8
2000	13.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.5	6.3	0.8
2001	75.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	42.8	32.5
2002	0.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.8
Total Net lifts		187.8 4	196.6 4	57.5 4	237.5 4	144.5 4	126.3 4	154.9 4	77.0 4	173.7 4	152.2 4	68.6 4	68.8 4	151.4 4	98.3 4	123.3 4	121.8 4	82.0 4	42.8 4

Table 7.– Mean density (number per hectare) for all fish species caught during spring (June) and fall (September or October) with 10 m headrope index trawls in Anchor Bay, Lake St. Clair.

Species	Spring							Fall						
	1997	1998	1999	2000	2001	2002	2003	1997	1998	1999	2000	2001	2002	2003
Alewife	10.6	2.5	1.9	3.9	2.9	3.0	0.0	30.7	11.5	1.6	2.8	32.3	0.0	0.0
Bluntnose minnow	0.0	0.2	0.0	11.1	10.0	6.8	0.9	33.5	0.2	9.4	14.8	53.8	32.7	12.5
Common carp	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.9	0.0	0.1	0.0	1.1	2.1	0.0
Emerald shiner	0.2	0.0	0.0	5.1	0.0	10.6	0.0	1.1	7.5	0.0	0.0	0.0	0.6	0.0
Freshwater drum	12.5	5.0	2.3	0.7	4.5	0.8	3.6	0.6	0.2	1.4	1.0	2.3	0.2	0.6
Johnny darter	2.8	7.0	0.0	0.2	0.3	0.0	0.0	4.0	0.0	0.0	0.10	0.0	0.2	7.2
Lake sturgeon	0.4	0.0	0.1	0.2	0.0	0.8	0.5	0.0	1.4	0.0	0.1	0.0	0.0	0.0
Largemouth bass	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	3.0	1.8	16.4	35.5	13.2
Logperch	75.6	83.3	7.6	0.2	1.6	7.5	0.0	40.0	20.6	1.3	5.2	17.5	5.9	13.6
Mimic shiner	26.3	1.6	0.0	13.5	20.4	362.3	0.0	1094.9	0.2	29.8	14.8	9.6	44.1	507.2
Muskellunge	0.2	0.0	0.1	0.0	0.6	0.8	0.0	0.2	0.0	0.0	0.1	1.1	0.0	0.4
Northern pike	0.4	0.2	0.0	0.1	1.3	0.0	1.4	0.4	0.0	0.1	0.3	0.6	0.6	0.6
North. shorthead redhorse	6.7	0.7	6.9	2.5	3.6	6.8	4.1	0.4	0.2	0.4	0.7	2.3	0.3	0.0
Pumpkinseed	0.6	0.0	0.0	0.0	1.9	0.0	0.0	4.0	0.0	1.6	0.4	5.1	5.4	3.2
Quillback	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.7	0.0	1.7	0.8
Rainbow smelt	656.1	4.3	4.0	3.8	61.1	0.0	14.0	16.5	0.2	0.0	1.0	0.0	0.0	4.0
Rock bass	17.5	5.4	1.0	12.8	29.8	38.5	18.1	81.5	0.9	89.0	92.8	39.6	40.8	34.9
Round goby	14.3	28.1	6.0	10.8	1.3	30.2	5.9	9.7	22.2	9.6	10.0	10.2	99.3	1.8
Silver lamprey	0.2	0.0	0.9	0.3	0.0	0.0	0.5	0.0	0.0	0.2	0.0	0.3	0.0	0.4
Silver redhorse	2.3	0.2	0.4	0.9	0.0	2.3	4.5	0.9	0.7	0.0	0.4	1.1	5.7	0.0
Smallmouth bass	3.2	0.5	0.0	0.8	2.9	3.8	1.8	10.6	24.5	10.7	6.1	0.0	51.4	6.8
Spottail shiner	122.6	8.2	68.9	935.4	7.4	5729.6	210.6	487.2	45.3	200.0	50.5	878.5	2406.5	1068.0
Trout-perch	345.9	98.5	154.0	34.3	11.0	264.9	13.1	92.3	25.8	2.9	0.2	0.0	9.7	5.7
Walleye	10.4	0.9	1.7	1.2	0.6	0.8	0.9	1.3	2.7	0.9	0.8	0.0	11.3	0.0
White perch	0.7	0.0	0.4	13.3	0.6	0.8	0.5	11.7	7.5	0.1	0.1	0.0	13.2	8.4
White sucker	3.7	3.6	0.0	2.5	1.3	61.1	2.3	2.3	0.0	0.3	1.0	0.6	8.0	0.7
Yellow perch	560.3	249.7	866.9	157.8	1131.7	724.5	306.1	26.8	68.8	21.7	40.9	113.8	73.3	181.2

Table 8.—Catch rate by age for yellow perch in June index trawl tows on Lake St. Clair.

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